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FRIDAY, JANUARY 7, 1887.

COMMENT AND CRITICISM.

STUDENTS OF THE PROBLEMS of taxation are directing attention to a law imposing progressive taxation, lately passed in canton Vaud, Switzerland, and which will come into operation with the beginning of the new year. The practical working and effects of the law will be closely studied. The project is undoubtedly popular; for when put before the people, as is necessary for the enactment of a law in Switzerland, it was passed by very large majorities. This new Vaudois law divides real property into three classes, according as it falls below \$5,000, between \$5,000 and \$20,000, or over \$20,000 in value. The proportion of tax is to be 1 per 1,000 for the first class, $1\frac{1}{2}$ per 1,000 for the second class, and 2 per 1,000 for the third class. Personal property falls into seven classes, the lowest class being less than \$5,000 in value, and the highest over \$160,000. The rates of taxation on these classes are to be in the proportion of 1, $1\frac{1}{2}$, 2, $2\frac{1}{2}$, 3, $3\frac{1}{2}$, and 4, respectively, per 1,000. Incomes from earnings are similarly put in seven classes; but, in estimating the amount to be taxed, a deduction is made amounting to \$80 for each person legally dependent on the head of the family for his support. A great many theories as to taxation will be put to test by the operation of this law, and its outcome will be watched with interest.

THE SYSTEM WHICH FECHNER deduced from the simple experiments of Weber has had the honor of exciting the criticism of nearly every eminent physiologist and physicist in Germany at one time or another during its brief career. Weber found, that, if you could just distinguish four ounces from five ounces, you could change the ounces to pounds without causing any change in the recognizability of the difference between the two weights. From this, with the aid of some hypotheses, Mr. Fechner deduced the psychophys-

ical law that the sensation is proportional to the logarithm of the excitation. The system has been attacked on every side, and Fechner's last hope is that it will stand, because the attackers cannot agree upon the mode of destroying it. But a consensus is now forming on the mode of attack. Dr. Adolf Elsas, in a recent pamphlet, boldly upholds that the system is unscientific from the root; that it does not follow from Weber's experiments except upon an unjustifiable assumption; and that no system of psychophysics, in Fechner's sense, is physically, mathematically, or philosophically possible. It is possible to state briefly where the confusion came in, viz., in mistaking the sensation of being different for a difference of sensation; but it is not possible to show in a few words how far-reaching the results of this misconception are. If a prediction is allowable, the statement may be hazarded that the outcome of the discussion will be a recognition of a valuable means of gauging the discriminative sensibility of the senses, the avoidance of many current errors in experimentation, and the conviction that it is as impossible to bridge the chasm between thought and nerve by psychophysics as by any other of the numerous methods that have been proposed.

AS WE STATED some time ago, the Kongo Free State has received a severe blow in the loss of the station at Stanley Pool. The official accounts of the affair have just reached us. It appears that the quarrel between Mr. Deane, an Englishman, who, with M. Dubois, commanded at the post, and the Arabs, was about a slave-girl who had sought refuge in the station. Notwithstanding the Arabs' threats, the young Englishman refused to give up the girl. A peace was patched up for the time being; but it was only a ruse on the part of the Arabs. Later they made an unexpected attack, and were repulsed. But soon ammunition ran short. The negro troops at the post took to their boats, and floated down stream to the next station of the association. This was commanded by Lieutenant Coquilhat. He ran up stream to the sta-

tion in his little steamer, only to find it in possession of the Arabs. Mr. Deane was found among some negroes soon after. M. Coquilhat thinks that the situation is quite serious; not, perhaps, so much for its effect upon the immediate prospects of the Kongo Free State, as because it will show the natives that the whites and the Arabs are no longer on good terms. Then, too, it brings the day nearer when the inevitable conflict between the trade association and the slavers must be fought out. It has also closed the route to the lakes *via* the Kongo and Tanganyika.

But the Kongo State has still an interest in connection with the relieving of Emin Bey, referred to in another column. Mr. Grenfell has ascended a large tributary of the Kongo, which joins the main river about twenty-five miles south of the equator, to a point in longitude east from Greenwich of $19^{\circ} 40'$, and in latitude 4.27° . Dr. Junker passed six years in the Niam-Niam territories. He telegraphs from Zanzibar that on one excursion he followed the Welle to longitude 22° east. These two points are not more than from one hundred and fifty to two hundred miles apart. It may be that the Welle, instead of being a tributary of Lake Tsad, is, after all, a branch of the Kongo. If this proves to be the case, and the river proves also to be navigable, the key to the Soudan may yet be found to be the Kongo railway and river.

THE ANNUAL REPORT of the directors of the English convict-prisons, drawn up by Sir E. F. DuCane, is interesting, principally because of the valuable statistical tables appended to it. It seems that the number of sentences of penal servitude passed by ordinary courts in England and Wales in 1885 was 1,027, a decrease of 23 per cent as compared with the number so sentenced in the previous year, which, in turn, was lower than any year on record, and only half the number sentenced to penal servitude twenty years before. At the date of the report, the convict-prison population was only 8,183, as against 11,660 in 1869. There is also a remarkable and gratifying decrease in the number of females under sentences of penal servitude. It is now but 821, only a little more than half what it was ten years ago. During the year the commencement of a new work for the war department near Chatham afforded some points of interest in connection with the employment of convict-labor. The report on this reads

as follows: "The work in question being quite in the open country, and distant about two miles from the prison at Borstal, special consideration was necessary before deciding that the work could be undertaken. Arrangements were ultimately entered into, which have enabled the convicts to be employed there with complete security. A line of narrow-gauge tramway has been laid down by the royal engineer department along the whole line occupied by the forts under construction, and this is made use of for the conveyance of the convicts to and from their work. A train of railway-carriages, specially fitted to insure the safe custody of the convicts, has been furnished. The site of the works is enclosed by a palisading ten feet high, with a ditch on the inner side, and wire entanglements on the inner side of the ditch. Warders and civil guards travel with the train, and an addition has been made to the armed guard at the works, where a selected officer is always in charge. A system of signals is established between the work and the prison, and an engine is always available in case any thing should be required, or to facilitate inspection by the superior officers of the prison all along the line."

Sir Edmund DuCane has also something to say about the operation of the separate system, which Pentonville prison was designed especially to carry out. He recalls, that, when the system of separate confinement was decided on, grave doubts were expressed as to whether it could possibly be carried out without injury to the mental and bodily health of the prisoners. At first the isolation and seclusion were very strict, and were imposed upon all prisoners for two years, after which they were removed to Australia. At first the apprehensions of the opponents of the separate system, those who had favored a system of silent or classified association, seemed justified; for it was found that a certain class of minds became enfeebled and lost their balance under the regimen adopted. As the result of this experience, the period of isolation was reduced to nine months, and its strictness was much modified. Since these changes, no evil results have followed; and Sir Edmund DuCane writes, that, "although a complete moral reformation is no longer expected to be the usual result, the separation undoubtedly prevents prisoners mutually contaminating each other, good influences have an opportunity of acting on them, and it has been found of the highest advantage as

a training and discipline preparatory to the subsequent stages of a sentence of penal servitude." At all events, the reform in the system of dealing with crime and criminals has produced such results that the directors find, that, instead of an increasing amount of crime and a swelling prison population, they are enabled, in spite of the increasing population of the country, to diminish the number of convict establishments.

AT THE LAST annual meeting of the British medical association, Dr. Shuttleworth of Lancaster read a paper on 'The relationship of marriages of consanguinity to mental unsoundness,' which has since been published in the *Journal of mental science*. Dr. Shuttleworth states, as evidence that there exists in the public mind a misgiving as to the propriety of such marriages, the fact that he is frequently asked whether any risk attends the marriage of cousins. Numerous contemporary authorities of good repute can be cited on both sides of the question. Dr. Shuttleworth shows that in early times no evil results were feared from the marriage of near kin, and quotes Jeremy Taylor to the effect that "the elder the times were, the more liberty there was of marrying kindred." In studying the history of the lower animals, it is found that "strict confinement to one breed, however valuable or perfect, produces gradual deterioration." Here, then, is the special danger of consanguineous marriages, especially as it seems to be the case that cousin-marriages are more frequent among neurotic than among perfectly healthy stock.

It seems that in 1871 Sir John Lubbock tried to insert a question as to cousin-marriages in the census schedules, but his proposal was rejected amid the scornful laughter of the house of commons as 'the idle curiosity of a speculative philosopher.' In France some attempt has been made to obtain information as to these marriages; and M. Boudin reckons that 0.9 per cent of all the marriages in France are between relations, 0.88 being between first-cousins. Other investigators present different returns, M. Dally contending that in Paris first-cousin marriages amount to 1.4 per cent of all the marriages; and M. Legoyt, chief of the statistical staff, estimates that throughout France first-cousin marriages form from 2.5 to 3 per cent of all marriages. In 1875 Mr. George H. Darwin undertook an elaborate in-

quiry into the subject in England, and, "by a series of careful mathematical processes, he satisfied himself that in England the proportion of such marriages averages from 1.25 per cent in London to 2.25 per cent in the rural districts for all classes of society, rising somewhat higher in the higher social grades." From this basis, and assuming that first-cousin marriages are not appreciably inferior in fertility to non-consanguineous marriages, Mr. Darwin concluded, that, unless we find in the idiot and lunatic asylums a larger proportion than the above figures would provide for, of children of first-cousins, then no evils, at least so far as mental unsoundness is concerned, can be attributed to first-cousin marriages. In an inquiry based on 4,308 patients, it was found that about 3.4 per cent of the inmates of asylums (5.25 per cent in Scotland) were the children of first-cousins. In Dr. Shuttleworth's own asylum at Lancaster, the record of 100 cases shows 5.1 per cent to be children of consanguineous marriages, and (included in this) 2.8 per cent of first-cousin marriages. The general conclusion seems to be that the propriety of first-cousin marriages must be decided for each case separately as it arises.

MR. STUART C. CUMBERLAND of mind-reading fame gives a very frank and rational account of his doings, in the December issue of the *Nineteenth century*. As a child, his perceptions were unusually keen. But his career as a mind-reader began only six years ago. His first attempt was entirely impromptu, but was as successful as any afterward. The gift was present; and future practice made it only quicker and more delicate, but not more certain. At first Mr. Cumberland frankly confesses he was apt to imagine himself supernaturally endowed, but soon convinced himself that the whole thing is simply an ingenious and skilled interpretation of the unconscious movements of the subject. 'Willing is either dragging or pushing,' is the mind-reader's formula. 'Distinct and intense apperception, fixed attention is incipient motion,' is the psychologist's conclusion.

The account of Mr. Cumberland's experiences with the nobility and eminence of Europe is extremely readable; but some notice of his general conclusions will be of greater interest here. The best subjects are among active brain-workers, statesmen, scientists, etc., where concentration is easy and usual. Military men make excellent subjects;

lawyers are dodgy and unsatisfactory ; musicians cannot fix their attention on any thing but music ; artists are better subjects ; clergymen are perfect in the drawing-room, but not in public ; physicians are good subjects when they have no theory about thought-reading. Von Moltke was the best and M. Dumas the worst subject. Englishmen and Germans are perhaps the best races for subjects ; while uncivilized races, such as Chinamen and Indians, are bad. Mr. Cumberland's opinion on thought-reading without contact is well worth quoting in full : "Some mystically inclined people claim to be able to read thoughts without contact. For my part, I have never yet seen experiments of this kind successfully performed, unless there had been opportunities for observing some phase of physical indication expressed by the subject, or unless the operator was enabled to gather information from suggestions unconsciously let fall by somebody around. I have on several occasions managed to accomplish tests without actual contact, but I have always been sufficiently near to my 'subject' to receive from him — and to act upon accordingly — any impressions that he physically might convey."

The power is doubtless not an uncommon one, and is closely allied to the knack for reading character, which is quite common, and to the usual processes by which we detect lies and suspicious persons, or avoid being imposed upon. Mr. Cumberland believes that the process might be of actual use in detecting criminals, and once succeeded in doing this himself. The operation of muscle-reading is a very fatiguing one, and the thing is apt to be overdone by amateurs. Mr. Cumberland's experiences are important, because they will aid in divesting these psychic tricks of the mysterious character so commonly ascribed to them, and in directing popular thought into more rational and healthy channels.

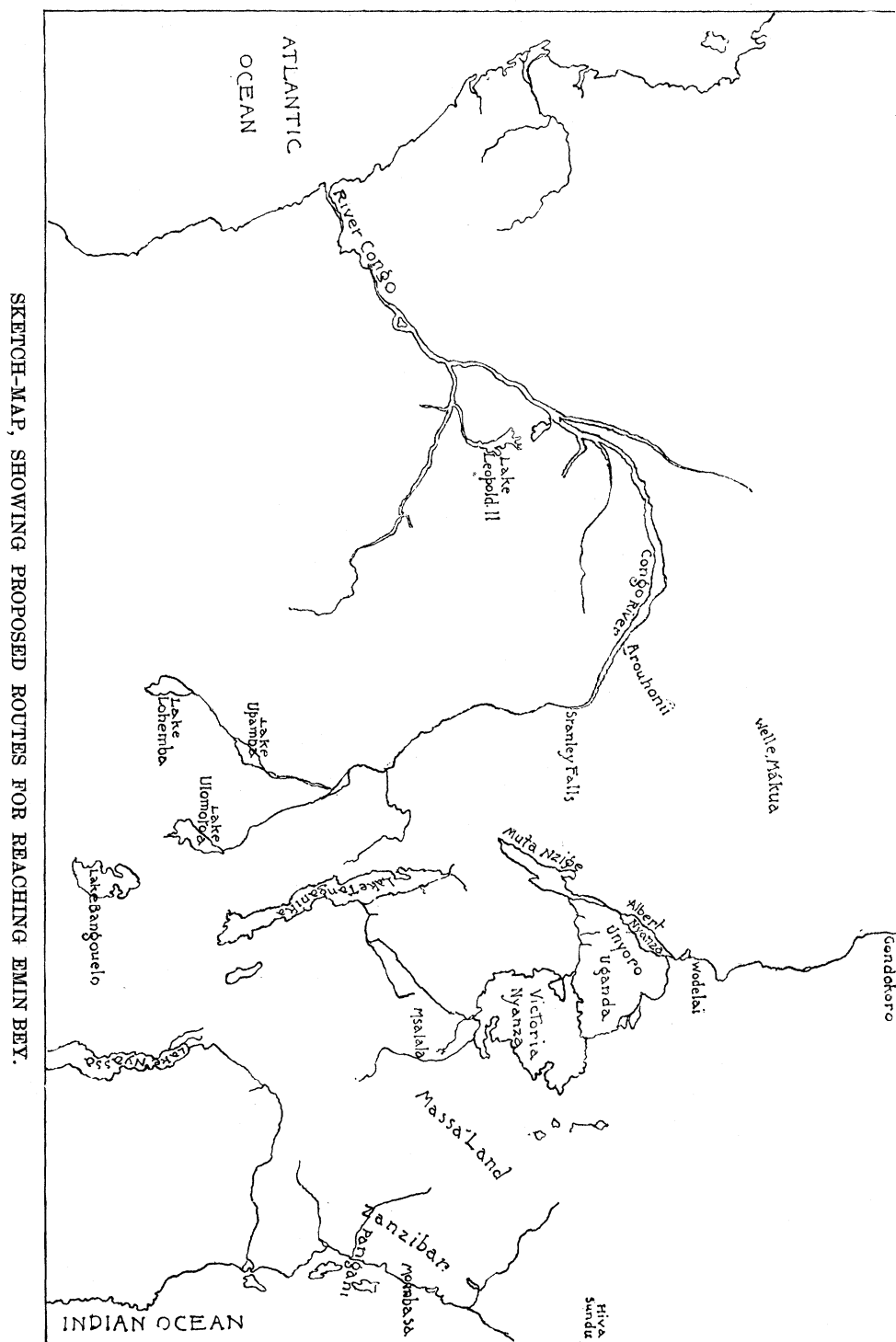
THE PRISONERS OF THE SOUDAN.

WHEN General Gordon fell at Khartoom, it was reported that an Egyptian army far up the Nile, commanded by Emin Bey, continued faithful to the khedive. Since then only vague rumors have reached us ; and it was generally believed that Emin Bey and his army had long since been overcome by the mahdi, his followers dispersed, and he himself killed. Within the last month, news has been received that Emin Bey is alive, and, though neglected and forgotten by the khedive

and his English rulers, is still fighting under the Egyptian flag against the followers of the mahdi.

About ten years ago, Emin Bey, then Dr. Schwitzler of Silesia in Austria, went to Egypt and entered the service of the khedive. He soon acquired the confidence of General Gordon, his commanding officer, and was rapidly promoted, and sent on several important missions into the southern part of Egypt. As a reward for his ability and success, he was made Emin Bey. When General Gordon was sent to the Soudan, Emin Bey was given command of the upper Nile, with headquarters at Lado, near Gondokoro. Here he was stationed when General Gordon was sent the second time to the Soudan. General Gordon was soon after besieged in Khartoom by the mahdi, and his communication both with upper and lower Egypt cut off. Emin Bey gradually retreated with his soldiers and their families up the Nile, fighting as he retired, and defeating the mahdi in several battles, until he made a permanent settlement at Wadelai, on the Nile (not far from Lake Albert), at the extreme southern limit of Egypt. His people are negroes from Nubia and the Soudan. For the last two or three years they have supported themselves by the cultivation of the land. "All the stations are busily employed in agricultural work, and at each one considerable cotton plantations are doing well ; this is all the more important for us, as it enables us, to a certain extent, to cover our nakedness. I have also introduced the shoemaker's art, and we now make our own soap," writes Emin Bey.

Emin Bey has but two Europeans with him, — Dr. Junker and Captain Cassati. Dr. Junker is a Russian scientist, and, like his friend and former companion, Dr. Schweinfurth, is a distinguished botanist. Eight or ten years ago he went to Africa, and continued the explorations commenced by Dr. Schweinfurth in the valley of the Bahr-el-Gazel, the western branch of the Nile. He also explored the head waters of the Wellé, — one of the largest tributaries of the Kongo, — and afterwards traced the course of another large river, which Dr. Junker himself believed to be the Arouhuimi. The troops of the mahdi overran the country, and Dr. Junker was forced to retire. By great good luck he succeeded in joining Emin Bey, and has remained with him. The other European with Emin Bey is Gaetano Cassati, formerly a captain in the Italian army. He left Italy in 1879, with several other Italians, and landed upon the east coast of Africa. They spent several years in that part of Africa which the Italians have explored, until his companions were killed and he made a prisoner. He finally escaped, and made his way to Emin Bey at Gondokoro.



At the request of Emin Bey, Dr. Junker with a small caravan left Wadelai for Cairo for the purpose of obtaining aid. Cut off from all communication down the Nile, he was compelled to proceed to Cairo *via* Zanzibar and the Indian Ocean. His route was south through Unyoro and Uganda to Lake Victoria, from there round the western shore of the lake to the English mission, and then east to Zanzibar. Kabrega, the ruler of Unyoro, has befriended Emin Bey, supplying him with food and stores. Moranga, the chief of Uganda, is hostile to Europeans, and may be remembered as the murderer of Bishop Hannington only a year ago. When Moranga heard that Kabrega had assisted Emin Bey, and had received Dr. Junker as his friend, he marched against Kabrega, and defeated him. Dr. Junker with great difficulty escaped, and reached the English mission of Msalla.

On the 8th of October a letter was received from Dr. Junker, dated at Msalla, Aug. 10, in which he pleads for deliverance for Kabrega, succor for Emin Bey, and the reconquest of the Soudan. If Kabrega is not delivered and the Soudan reconquered, the prestige of Europe in central Africa, will, he says, be lost; and if Emin Bey falls, it will be to the eternal shame of Egypt and England. These are the objects of his mission to Europe. He signs his letter, "Your affectionate friend, *disparu et enfin retrouvé*."

As it took Dr. Junker more than six months to reach the English mission, a distance of only three hundred and fifty miles, he must have had much difficulty in passing through Uganda. He left the mission as soon as his caravan was ready, and reached Zanzibar the 20th of December, and expected to arrive at Cairo on the 10th of January, 1887. Thus far, no attempts have been made, either by the English government or the khedive, to relieve Emin Bey; but an expedition under Dr. Fischer, a German naturalist who had spent many years on the coast, was sent out by geological societies of Germany, aided by the German government. It started from Pangani, on the eastern coast of Africa, about fifty or sixty miles north of Zanzibar, in August, 1885. It reached Victoria Nyanza, but, being unable to proceed any farther, returned to Zanzibar last June.

In the early part of the present year, Dr. Oscar Lenz was sent out by the Austrian government to try to reach Emin Bey by the western coast of Africa. He steamed up the river Kongo to Stanley Falls, and left there on the 4th of April, intending to sail up the Kongo to Nyangwé, where Stanley launched his boat in 1877 on his expedition across the Dark Continent. From there

Dr. Lenz hoped to cross to Lake Tanganyika, thence by Lake Muta Nziga and the Albert Nyanza to Wadelai. This part of Africa is occupied by Mohammedans, traders in slaves and ivory, who bitterly oppose all explorations that might interfere with the slave-trade. They have recently seized the station of the Kongo Free State at Stanley Falls, and driven the Europeans down the river. It is therefore doubtful whether Dr. Lenz will succeed in passing through this country.

Dr. Joseph Thomson, an Englishman who has spent several years in eastern equatorial Africa, and who commanded the Royal geographical society's expedition through Massai Land to Lake Victoria during 1883 and 1884, offers to head a party to relieve Emin Bey. He proposes to start from Mombassa (a port on the Indian Ocean, 4° north latitude, and 120 miles north of Zanzibar), passing north of Kilimanjaro (a high mountain covered with eternal snows, which Dr. Thomson vainly attempted to ascend, but which has been recently ascended by Mr. H. H. Johnston), through the country of the Massai to Kwa Sundu, on the north-eastern shore of Lake Victoria, thence through Uganda to Wadelai.

Though this route is north of the one taken by Dr. Fischer, yet the general character of the country is the same, and it is inhabited by the tribes of the Massai, a most warlike race. Dr. Thomson succeeded in crossing this territory in 1883, but the people are now more hostile to Europeans, exacting heavier tolls and higher prices for provisions, and frequently robbing and murdering travellers who attempt to pass through. To show the great change in the treatment of Europeans by the negroes, it is only necessary to contrast the account given by Mr. Stanley of Uganda in 1875 and that given by the London *Times* of December, 1886. Mr. Stanley says, "From the time the voyager touches Uganda ground, he is as safe and free from care as though he were in the most civilized state in Europe. He and his are in the hands of Mtesa, emperor of Uganda." The London *Times* says Munga, king of Uganda, "dares to torture and massacre the converts of its missionaries, and an English bishop, without fear or even reproach."

Travelling in central Africa is made by very slow stages. Dr. Thomson did not reach Lake Victoria until one year after his arrival at Zanzibar, and then he had travelled only two-thirds of the way to Wadelai, and that the least difficult part.

It is understood that Stanley has been summoned to Europe to take command of an expedition fitted out by the Egyptian government, un-

der the advice of England, for the relief of Emin Bey. The Belgian papers state that his route will be up the Kongo to Arouhuimi (the tributary referred to above), which empties into the Kongo near the equator, some distance below Stanley Falls. Mr. Stanley, on his last visit to the Kongo, sailed up this river for some distance, and believed it to be the outlet of the Wellé. From the head of navigation on the Arouhuimi, the route is east to Wadelai. Only about two hundred miles are said to be unexplored. The country is inhabited by peaceful negroes, food is easily obtained, and difficulties are less than by the other route.

A cable from England states that Mr. Stanley will sail for Zanzibar, and go directly to Albert Nyanza, through Massai Land; but we may well doubt this information, for although Mr. Stanley, in crossing the Dark Continent, went by Victoria Nyanza, he took a route south of the one now proposed; and he is much better acquainted with the Kongo route. It is possible that Mr. Stanley may sail to Zanzibar, remain there long enough to procure kroomen and porters, and sail with them to the Kongo, and thence up that river to the Arouhuimi.

The need of Emin Bey for relief appears from his letter, dated, Dec. 31, 1885, received in England Oct. 28. This letter brings the only news received¹ from him in three years. He writes that he almost despairs of receiving succor from the north, for he has heard nothing from Cairo or England since April, 1883; that he is without stores and clothing; and that his ammunition is nearly exhausted. With the enthusiasm of a scientific man, he adds that he has worked with ardor at the formation of a grand collection, chiefly zoölogical, including skulls of the different tribes of negroes and of the chimpanzee, skeletons of various animals and two of the Akka of different sexes; and he will endeavor to complete it during his sojourn there. He promises to keep his post as long as possible, trusting, that, if Egypt still governs the Soudan, she must send relief in time. If the Soudan has been abandoned, he will move southward with his troops, until he is relieved by the government or has placed his people in safety. "With the exception of the human skulls, I have saved all my collection, and will not abandon them until the last. Formerly I received two or three times a year letters and newspapers. Alas! it is so no longer. I strive by every means to sustain my own courage and that

of my people. God has certainly protected and sustained me hitherto, and I have confidence, that, with his help, all will go well in the future."

He adds, "I have secured for — a collection of shells from Lake Albert, which I will send by the missionaries at Uganda, and which I hope will reach him safely. — EMIN BEY."

STANDARD TIME AND MEASURES.

AT the recent annual meeting of the American metrological society, letters were read from W. F. Allen, secretary of the general time convention, and from Sandford Fleming of Ottawa, Canada, from which, as they contain considerable information, we quote somewhat liberally below.

Mr. Allen stated that he is at present engaged in quite an extensive correspondence with a view to bringing about the adoption of standard time by those cities which still adhere to local time. This movement has already resulted in success in two instances. In Belfast, Me., eastern time was adopted on Dec. 15, 1886, the clocks being set twenty-four minutes slow; and in Pittsburg, Penn., where an ordinance was passed adopting eastern standard time from Jan. 1, 1887, when the clocks were set twenty minutes fast. It is probable that the legislature of Maine will pass a law at its coming session making eastern time the standard for the state. Correspondence with the superintendents of public schools in a number of the cities of Ohio has developed the fact that a strong feeling in favor of the adoption of standard time exists in that state, from which favorable action is likely to come in the near future. The twenty-four o'clock scale is in use upon the Canadian Pacific railway west of Winnipeg, upon the Manitoba and north-western railway, and upon the Idaho division of the Union Pacific railway. It is proposed to adopt it soon on all the divisions of the Union Pacific railway. Under instructions from the general time convention, Mr. Allen is preparing, and will shortly issue, a circular asking the views of the leading railway officials on the subject of the general adoption of this scale for employees' time-tables and advertisements.

Mr. Fleming bore especially on the benefits to be derived from the twenty-four hour system, which has been put in practice on at least two thousand miles of railway. For the past six months the railway stretching from Lake Superior through Canada to the Pacific coast has been operated on the twenty-four hour system. "The towns and villages along the line," writes Mr. Fleming, "have with great unanimity accepted the change, and

¹ Since this article was written, we have read another letter from Emin Bey, dated July 7, 1886, and then his province was in complete safety and order. These letters show that the necessities of life are not wanting; but how long he can maintain himself depends upon the strength of the Mohammedan army under the new mahdi on the north, and of the army of the negroes from Uganda on the south.

not a single voice has been heard in any quarter expressing a desire to return to the old usage. So satisfactory in every way has the new system proved, that the Canadian Pacific railway company have decided to extend its application eastward to Ontario and the valley of the St. Lawrence. The branch and connecting lines are following the same course, and I am assured that by the end of next year the twenty-four hour system will be in common use by the railways from Halifax in Nova Scotia to Vancouver on the Pacific coast. You are, no doubt, already aware that the twenty-four hour system is in use throughout the extensive lines of telegraph between Great Britain, Egypt, India, South Africa, China, and Australia and New Zealand."

However important these changes are, they can only be viewed as provisional steps in the general unification of time throughout the world. They are means to an end, and the great end of the movement may be the universal adoption of a new notation of time which will be common to all nations. It is only step by step, and by familiarizing men's minds with the new ideas, that the larger reform can be accomplished. With this end in view, the Smithsonian institution, desiring to co-operate in the movement, have agreed to publish and circulate, in all countries where their reports are sent, a paper on 'Time-reckoning for the twentieth century.'

"This question," continued Mr. Fleming, "has an educational interest; and, such being the case, much could be done by appealing to the educational institutions. Probably the most effective means of influencing the rising generation of this country would be to bring the subject under the notice of the public schools. If the children of both sexes were taught the true principles of time-reckoning, in a very few years their influence would be felt, and the main obstacle in the way of adopting a common notation would disappear throughout this continent. I venture to suggest, therefore, that the society would in the highest degree advance the important movement by taking such steps as may be deemed necessary and proper, to bring the question to the notice of the superintendents of education in each state with the view of reaching each boy and girl of school age between the two oceans. If America takes the lead in this matter, I do not doubt that the other continents will follow in good time."

The society would be pleased to correspond with any one desiring to use his influence in bringing about the adoption of the metric system, or who is interested in a common method of time-reckoning such as is indicated in Mr. Fleming's letter.

The office of the secretary is at Columbia college.

The officers for 1887 are, president, F. A. P. Barnard, president of Columbia college; vice-president, Prof. E. N. Horsford, Cambridge, Mass. recording secretary, Melvil Dewey, librarian Columbia college; corresponding secretary, Alfred Colin, New York; treasurer, Prof. J. K. Rees, Columbia college.

THE NATURALISTS' MEETING AT PHILADELPHIA.

THE meeting of the Society of naturalists held in Philadelphia during Christmas week was attended by about fifty members, and proved an enjoyable and stimulating gathering. The strict enforcement of the rule limiting membership to persons "who regularly devote a considerable portion of their time to the advancement of natural history," allows only a slow growth to the society, but it insures the illumination of the association by its members, rather than the reverse. Mutual acquaintance is increased; the meetings become as informal as meetings may be; and the naturalist, who has spent a good part of the year too much alone in his own company, finds suggestive intercourse with his fellows. The constitutional object of the society is chiefly the discussion of *methods* of investigation and instruction; for it is held that the announcement of the *results* of investigation finds more fitting and sufficient opportunity in local societies. But in the present day of special investigation there is some danger that the detailed description of methods, useful in their place, and entertaining enough to a few members, may still fail to hold the attention of the meetings as a whole; especially when, as too often appears, the inventive specialist has failed to cultivate the art of presentation.

The day that was devoted to methods of teaching was apparently the most satisfactory to the gathering. H. S. Williams of Cornell spoke on general instruction in geology; Davis of Harvard followed on instruction in geological investigation. In the afternoon, Farlow of Harvard considered the lines profitable for botanical investigation in the United States. Martin of Johns Hopkins discussed collegiate teaching of biology, and Whitman of Milwaukee described the proper position of biological investigation in the university. All these papers awakened the meeting to active discussion, and it was decided that the executive committee of the society should consider the advisability and means of publishing the proceedings of the day; for it was generally agreed that both the papers and the discussion that they ex-

cited would be read with profit and encouragement by teachers far and wide. In view of the interest thus awakened, it was suggested that a day be set apart in the meeting a year hence for the discussion of science in the schools. During the session, Professors Leidy and Lesley were added to the list of honorary members, Professors Baird, Dana, and Gray having been previously elected to this class.

NOTES AND NEWS.

THE lectures delivered by Prof. Rodolfo Lanciani, LL.D., government director of archeological researches at Rome, before the Lowell institute, Boston, are full of interesting and instructive matter. The lecturer, after describing the humble origin of Rome, and the simple matter-of-fact causes which led to its foundation on the Palatine Hill, considered the sanitary conditions of the district which surrounded the new town. During prehistoric times the whole region was volcanic and free from malaria, and when it ceased to be volcanic, then malaria began. The clearest proof of the virulence of malaria in Rome in the first century is afforded by the number of altars and shrines dedicated to the goddess of the fever. At the time of Varro there were not less than three temples of the fever left standing. The principal works of improvement successfully completed in ancient times for the benefit of public health and for checking malaria were: I. The construction of drains; II. The construction of aqueducts; III. The multiplication and paving of roads; IV. The right organization of public cemeteries; V. The drainage and cultivation of the Campagna; VI. The organization of medical help. Professor Lanciani developed fully these points; and we regret, that, owing to want of space, we cannot follow him more minutely. The lectures are unique, and worthy reproduction in a permanent form.

—Physicians will doubtless remember the case of the late Dr. Groux of Brooklyn, who had the power of stopping the action of the heart at pleasure. Dr. Lydston of Chicago, in a note to the *American practitioner and news*, claims to have the same power, and to have demonstrated it to members of the medical profession.

—At a recent meeting of the Society of arts, Capt. Douglas Galton, chairman of the council, delivered an address which was a retrospect of the progress made in sanitation by the English nation during the reign of Queen Victoria. The registration of births, marriages, and deaths came into operation in 1837, ten days after the queen's accession to the throne. The sanitary condition

of the country was wretched at this time. One-tenth of the population of Manchester, and one-seventh of that of Liverpool, lived in cellars. In 1845 a chapel in the immediate neighborhood of Lincoln's-Inn Fields was used as a schoolroom in the day-time, and a dancing-saloon at night. In the cellars underneath this chapel ten thousand bodies had been buried in the seventeen years ending 1840, the burials were still continuing, and the old coffins were removed through a contiguous sewer to make room for new ones. In the rural districts the same neglect of the public health was also prevalent. The various acts which have been passed during these fifty years have contributed greatly to the welfare and prosperity of England as a nation. In the decade 1850-60 the annual average saving of lives in England and Wales from sanitary improvement was 7,789; 1860-70, it rose to 10,481; 1870-80, it was 48,443; and in the five years 1880-84, the average annual number of lives saved by sanitary improvements has been 102,240.

—Mr. E. D. Preston of the U. S. coast and geodetic survey left last week for the Sandwich Islands on an important mission for that government. The object of his visit is the determination of astronomical latitudes on these islands, fifteen stations having already been decided upon. The pendulum will be swung at a great elevation, and also at the sea-level, to determine the downward attraction of some of the principal mountains. The latitude stations will be on the following islands: Kauai, Oahu, Molokai, Maui, and Hawaii. The work will probably show great deflections of the plumb-line on all the islands, and the pendulum work will no doubt confirm previous experiments on island stations; viz., that islands give an excess of gravity. The observations will occupy about four or five months. A copy of all observations will be deposited in the coast and geodetic survey archives. The work is done entirely at the expense of the Hawaiian government, the coast survey loaning the necessary instruments.

—Congressman Hatch, chairman of the house committee on agriculture, has received from Commissioner Colman of the agricultural department a reply to the resolution offered by Mr. Swinburne of New York regarding the cause and extent of pleuro-pneumonia in cattle. The commissioner sets forth the difficulties met in the attempt to extirpate or control this disease in the present state of the law, and with the machinery at hand, and re-enforces his recommendations previously made for more heroic methods. The commissioner again recommends as the only measure

which will extirpate the plague, and prevent both the direct and indirect losses, that, wherever an infected herd is discovered, all exposed animals should be slaughtered, the premises thoroughly disinfected, and the owner compensated for the loss to which he is subjected for the protection of the public. He urges upon congress the necessity of legislation giving to the departments power to carry out the measures required for extirpating pleuro-pneumonia untrammelled by state laws or state authorities, and it is expected to promptly suppress this disease.

— W. Stainton Moses, lately a vice-president and a member of the council of the English society for psychical research, has withdrawn from the society. In his letter of resignation, Mr. Moses says, "I have concluded, that, as a representative spiritualist, I could not do otherwise, considering, as I do, that the evidence for phenomena of the genuine character of which I and many others have satisfied ourselves beyond doubt, is not being properly entertained or fairly treated by the Society for psychical research."

— Professor Rohé of Baltimore, in a paper read at the last meeting of the American medical association, recommended that instruction in cookery be made a part of the curriculum of the public schools, and that mental philosophy or trigonometry should be dropped in order to make a place for it. In a number of schools and seminaries throughout the country the art of cooking is taught. In Lasell seminary at Auburndale, Mass., it has been taught since 1877. The Boston cooking-school was started in the same year. Similar schools are in operation in Raleigh, N.C.; Staunton, Va., and Washington, D.C. In London practical lessons in cookery are given in the girls' common schools. In Boston, Mr. Hemmenway of that city has succeeded in persuading the members of the school board to make instruction in cookery a part of the regular system of instruction.

— Mr. J. W. Walker has discovered on the south side of Pine Mountain, Georgia, nearly two hundred feet above the famous corundum-mine, a site where the ancient inhabitants of that region manufactured their talc vessels for cooking. Evidences of the use of stone implements in the work are indubitable. The vessels were blocked out and hollowed before being broken from the ledge. Many of the remaining fragments are honey-combed by exposure for a long time. Archeologists are familiar with similar phenomena elsewhere. Dr. Rau of the Smithsonian institution mentions several sites in the District of Columbia, and Paul Schumacher gives an elaborate account of the working of such quarries in southern Cali-

fornia (Wheeler's *Report on U. S. geog. surv. west of 100th merid.*, vii. 117-121). Dr. Abbott's paper in the same volume (pp. 93-116) should also be consulted.

— On Nov. 10, 1886, a meeting of intercolonial delegates was held at the Royal society's rooms, Sydney, for the purpose of forming an Australasian association for the advancement of science. The following delegates were present:—Victoria: Field naturalists' club of Victoria, the Rev. Dr. Woolls; Geological society of Australasia, and Historical society of Australasia, Mr. R. T. Litton; Royal society of Victoria, Mr. K. L. Murray; Victorian institute of surveyors, Messrs. W. J. Conder and W. H. Nash; Victorian engineering association, Professor Kernot and Mr. K. L. Murray. Queensland: Geographical society of Australasia, Queensland branch, Mr. J. P. Thompson; Royal society of Queensland, Mr. Henry Tryon. Tasmania: Mr. James Barnard. New Zealand: Philosophical institute of Canterbury, Mr. S. Herbert Cox. New South Wales: Linnean society of New South Wales, Professor Stephen; Royal society of New South Wales, Mr. H. C. Russell, Professor Liversidge, Mr. C. S. Wilkinson; New South Wales zoological society, Dr. A. T. Holroyd; Sydney branch of the Geographical society of Australasia, Sir Edward Strickland. In the absence of Mr. C. Rolleston, president of the Royal society, Mr. Russell was voted to the chair. The first election of officers will be held in Sydney in March, 1888, and the first meeting of the association in the first week in September, 1888. Professor Liversidge was appointed convener for the next meeting, and a hearty vote of thanks was accorded to that gentleman for the part he had taken towards the formation of the new association, general satisfaction being manifested at the successful result of the meeting.

— Mrs. Thomas Say, the widow of the well-known naturalist who has been dead over fifty years, died at Lexington, Mass., on Nov. 15 last.

— Our Vienna correspondent writes us, "I was recently present at the trials made with a new pistol invented by Mr. Marcus, a distinguished mechanical engineer. In this invention the use of a cartridge is dispensed with, the bullet itself being prepared with an explosive. But, in spite of this explosive nature of the bullet, its shape is not altered by the explosion. The explosion is initiated by a simple mechanism provided in the interior of the pistol. The experiments were made with a single-barrel pistolet (the barrel being four centimetres long, and its caliber six millimetres). At a range of thirty paces a three-quarter-inch thick wooden board was pierced by

the bullet. Then a pistol with a simple-acting magazine, containing twelve bullets, was tried, allowing to give off forty shots per minute."

— Baltimore is about to build a crematory modelled after that of Buffalo.

— From the *Medical and surgical reporter* we learn, that, among the recruits recognized as unfit for military service in Switzerland in 1885, were 66 per cent of the tobacco-workers, 67 per cent of the basket-makers, 60 per cent of the tailors, 25 per cent of the butchers, and 25 per cent of the stonemasons and carpenters. Of 6,154 recruits in canton Berne, 1,833 were refused; of these, 581 suffered from goitre, and 162 from flat-foot.

— The Abbé Laflamme, of the University Laval, Quebec, has presented a note to the Royal society of Canada ('Memoirs,' 1886) on the contact of the paleozoic and archæan formations in his province. Numerous exposures were examined, and in nearly all of them the Trenton limestone was found resting immediately on the clean, firm, rather smooth surface of the gneiss, without transitional deposits. Fragments of the crystalline rocks in the stratified are seldom found. The limestone beds follow the irregularities of their foundation, mantling over the mounds, and descending into the hollows. At certain points a sandstone lies on the crystallines: this is regarded as a time-equivalent of the Trenton, owing its composition to local geographic control not felt elsewhere. The change from the Trenton limestone to the overlying Utica slates is described as abrupt, without traces of gradual transition.

— The Franklin institute of Philadelphia has recently determined to attempt the formation of a state weather-service for Pennsylvania on the plan generally pursued by these organizations. The offer of the chief signal officer to furnish a member of the signal corps to assist in the work is accepted, and the legislature is to be petitioned for an appropriation of three thousand dollars for instruments and publications. The chairman of the committee in charge of the matter is Mr. W. P. Tatham, who should be addressed, in care of the Franklin institute, Philadelphia, by volunteer observers in Pennsylvania qualified for the work proposed.

— An account of the hurricane of March 3 and 4, 1886, over the Fiji Islands, was read at a recent meeting of the Royal meteorological society in London, by Mr. R. L. Holmes. This storm was the most destructive that has ever been known to occur in the Fiji group. The lowest barometer reading was 27.54 inches at Vuna, in Taviuni.

The storm was accompanied by a great wave from 18 to 30 feet in height, which swept over the land, and caused an immense amount of damage. It was reported that 50 vessels were wrecked, and 64 lives lost, during this hurricane.

— The state board of health of Pennsylvania has issued its first annual report. It includes reports on the pollution of the Schuylkill River, the sanitary condition of Harrisburg, a detailed account of the typhoid-fever epidemic at Plymouth. In this famous epidemic there were 1,153 cases of sickness, with 114 deaths, and an expense of \$97,120.25. A description of the disinfection apparatus employed at the municipal hospital of Philadelphia is also given.

— The ninth biennial report of the state board of health of California has just been issued. For the year ending June 30, 1885, there were 8,238 deaths recorded in the state: 1,227 deaths occurred from consumption. The rate from this cause is but little less than that of Massachusetts.

— The state board of health of Massachusetts has issued a manual containing the statutes of that state relating to the public health, and the decisions of the supreme court relating to the same.

— A wood-turner of San Francisco died ten days after receiving an injury to the brain which was not discovered until several days afterward. While at work at his trade, a steel chisel became detached from a grooving-machine, and struck him in the head, producing a fracture of the bones of the nose, and severely injuring the left eye, so seriously as to destroy that organ and necessitate its removal. After the removal of the eye, the surgeons found behind it a piece of steel three and a half inches long, one inch wide at the centre, and tapering to sharp points at the ends. One end was buried one inch and a half in the brain. The velocity and force with which this chisel must have entered the brain may be imagined when it is stated that the drum to which it was attached was making twenty-three hundred revolutions a minute.

— A correspondent of the *Medical press* writes from Berlin that the toxic qualities of the cholera bacillus have been investigated by Professor Cantani of Naples. He claims that the poison may be due to ptomaines, to the secretions of the bacilli, or to the bacilli themselves. Experiments made on dogs lead him to incline toward the last theory. Pure cholera cultures in beef-tea sterilized by heating to 100° C., injected into the dog's peritoneum, produced all the symptoms of cholera-poisoning; while pure beef-tea, injected in the

same manner, left the animals in perfect health. This certainly would demonstrate toxic qualities for the dead bacilli when absorbed by the living body.

—Dr. McEachran, live-stock inspector for Canada, is opposed to the inoculation of cattle for the prevention of pleuro-pneumonia. He believes, that, in every country in the world where it has been impartially tried and reported on, the report has been unfavorable. He regards it as a dangerous operation, and not warranted by any known benefits. Many die from the operation itself, and wherever it is practised it has to be kept up. Thus in Scotland, where inoculation is practised, there is a constant supply of the virus; and the cities of Glasgow and Edinburgh are active centres of the disease.

—The recently held meeting of the French congress of surgeons was a very notable one. M. Ollier of Lyons, well known for his experiments in bone-grafting, presided at the meeting, which was attended by many of the most eminent surgeons of France, as well as by other men of note, among whom were the president of the senate and the rector of the university. The most interesting discussion was that in regard to tetanus, or, as it is commonly called, lockjaw. It was opened by M. Vaslin of Angers. He regards it as a purely nervous disease, and, in support of his views, narrated a case which had come under his own observation, in which the disease was due solely to emotional causes, and which was cured by chloral and morphine. Professor Balestreri of Genoa concurred with M. Vaslin, and related several cases which he had treated, and which were successful. Professor Thirier of Brussels, on the other hand, believed tetanus to be contagious and of a parasitic nature. M. Mannoury of Chartres denied its contagiousness, and said, that, after conferring with a good many veterinarians, he was unable to learn of a single case in which the disease was communicated from one animal to another. Professor Verneuil of Paris is a firm believer in the contagiousness of tetanus, and thinks that it can be contracted by man from the horse. He said that human beings are often attacked with tetanus when living with or near animals affected with the disease, and that it often follows horse-bites. Wounds which have in any way come in contact with earth or straw soiled by horses are more liable to be accompanied by tetanus than others; and the disease is most frequent among stable-boys, horse-dealers, and, in general, those whose duties bring them in contact with horses. Notwithstanding all these arguments, it was generally admitted that all attempts to convey the

disease experimentally from an affected animal to a healthy one had failed. M. Blanc of Bombay thought the disease to be contagious, and communicated sometimes through infected water. Interesting papers were read on bone-grafting, and the uniting of divided nerves by suturing. The author of the latter paper believed that severed nerves may be made to unite in a few hours.

—The sermons and autobiography of Mark Pattison, late master of Lincoln college, Oxford, excited such general interest, that arrangements are making to publish a volume of selections from Mr. Pattison's miscellaneous writings.

LETTERS TO THE EDITOR.

**.*Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

Polarization of resistance coils.

IN August last Professor Mendenhall, in conversation with the writer, alluded to his observation of the polarization of certain resistance coils, and suggested an examination of the coils in this laboratory. The examination was made, and the results stated in remarks upon Professor Mendenhall's paper at the Buffalo meeting of the American association. A brief account may not be without interest and value.

The idea entertained by Professor Mendenhall at the time seemed to be that the polarization was of a 'statical' nature; the deflection obtained on connecting the coil, through which a current had been passed, with a galvanometer, being produced by the 'residual charge.' The examination of our coils was undertaken with the same idea, the 'condenser discharge' method being made use of, substituting the coil under trial for the condenser. The galvanometer was a 6,000 ohm astatic Thomson, by Elliott Brothers, its needle making a vibration in about ten seconds. A Fuller cell and Sabine discharge key were used. Polarization was found in every coil in the laboratory, except in a standard B.A. unit from Elliott Brothers. It was also found in a Hartmann box loaned for examination by Messrs. Queen & Co. The effect was found to vary widely in different coils in the same box, particularly so in a box of 100,000 units from Elliott's, whose 40,000 coil gave 40 degrees deflection against 6 or 7 degrees for any other coil in the box. On opening the box, it was found that the 40,000 coil had been heated till the paraffine had melted and some of it had run off, while the other coils were well covered, as usual in Elliott coils. The Hartmann box, whose coils were not paraffined, showed the effect more strongly than any except the 40,000 Elliott. It was observed that the coil terminal connected to the positive pole of the battery in charging, was itself positive in discharging; that reversing the battery reversed the discharge deflection; that the deflection was not momentary, as with condensers, but that it indicated a steady current, diminishing slowly, but not ceasing in some instances after eight or ten hours; that when the coil was charged by battery for several minutes, and then the current reversed and allowed to flow a few minutes longer, the discharge current was at first due to the last charging current, but after a time it ceased, and was followed by another

discharge current due to the first charging. An experimental coil was then made up of 1,800 ohms of wire having unparaffined cotton insulation. It was wound on a warm rainy day, and tested immediately, showing the strongest polarization found, driving the spot of light violently off the scale. The coil was then baked in a hot-air oven at 150° C. for an hour, and tested again when cool. No trace of polarization could then be found, though the charging current was increased. The previous observations of course indicated electrolytic polarization as the disturbing cause; and the last showed, that, in the case of that coil, it was electrolysis of water absorbed from the air by the cotton insulation. The experimental coil was then heated, and soaked well with pure paraffine, and drained while hot until it seemed to be as nearly as possible in the same condition as the 40,000 Elliott coil, and tested when cool. No trace of polarization was shown. It was then put aside in the instrument case to see whether it could still absorb water enough to polarize. Ten days later, just after the Buffalo meeting, the coil was tested again and polarized strongly. On heating it again, the polarization entirely disappeared. A drop of hydrant water placed on the coil caused polarization to re-appear in five seconds, and in five minutes the effect was so strong as to drive the needle to its stops.

The degree of error in measurement resulting from polarization was not examined, but Professor Mendenhall's statements show that it may be a considerable quantity.

It is obvious that unparaffined coils are, on this account, unsuited to the best work; also that coils well paraffined (as in the B.A. unit coil) or coils freshly baked and paraffined are free from such error.

The paraffining of ordinary coils, even when as thoroughly done as by the Elliotts, is not a permanent protection, probably because of cracking of the mass of paraffine, allowing vapor to reach the wire and insulation. A test will quickly determine the condition of any particular coil. A box might be made proof against polarization by filling entirely the space about the freshly baked coils with pure paraffine, just warm enough to flow freely. Temperature difficulties could be in part overcome by thermojunctions, as in standards. Another and on some accounts better plan would be to mount the coils in an impervious box with liquid-tight joints, and filling the interior with a petroleum oil, which may readily be found in market, of such quality as to exhibit no polarization. With such a box, there need be no uncertainty as to the temperature of the coils.

BENJ. F. THOMAS.

Columbus, O., Dec. 27.

Atmospheric lines in the solar spectrum.

The ingenious device recently published by Mr. Conner, for detecting the lines in the solar spectrum due to the earth's atmosphere, recalls a similar plan proposed by the writer some years ago. In a letter dated Feb. 21, 1883, I wrote to Professor Rowland, "I hope that you will try the experiment of which I spoke to you last summer, — forming two images of the sun, and photographing the spectra of the opposite limbs. A glance would serve to distinguish the solar from the telluric lines." An accompanying sketch showed that a double-image prism was to be placed between the slit and a lens forming an image

of the sun upon it. This prism was to be moved until the two images were in contact. The east and west limbs were thus brought together, and the slit was placed at right angles to their line of junction. In the photograph, telluric lines should cross the spectrum undeviated, while solar lines would be bent in opposite directions where they crossed the line of separation of the two spectra. The advantages of this method over that of Mr. Conner are, first, its simplicity, as it is easily tried by any one who has a spectroscope giving a sufficient diffusion; secondly, the solar lines, instead of becoming hazy, continue well defined. For these reasons I call attention to the matter, and not to detract from the credit due to the eminent French physicist, who has preceded me both in trying and publishing a solution of this very important problem.

EDWARD C. PICKERING.

Harvard coll. observ., Jan. 1, 1887.

A brilliant meteor.

On Jan. 3, 1887, at 5.15 P.M., I observed a meteor of unusual brilliancy. It started, as nearly as I could make out, from the constellation Ursa Minor, possibly a little higher up, moving with a rapid rush and brilliant light in an easterly direction. As it neared the horizon, its speed apparently diminished, until it disappeared behind some trees. It was visible fully thirty seconds, and, during the last part of its flight, appeared to float slowly downwards. A trail of considerable length was drawn behind, giving it the appearance of a large rocket. Its flight was unattended by any sound.

R. W. WOOD, JR.

Jamaica Plain, Mass.

What was the rose of Sharon?

I notice in your issue of Dec. 31 an article on the rose of Sharon. Without desiring to enter into the discussion of this subject, I wish to refer those interested to a few words upon this subject by an eminent investigator. Speaking of that part of the pleistocene plain near Jaffa, bordering the Mediterranean Sea, Sir J. W. Dawson, in his recent work on 'Egypt and Syria,' says, "In February we found it gay with the beautiful crimson anemone (*A. coronaria*), which we were quite willing to accept as the 'rose of Sharon,' while a little yellowish-white iris, of more modest appearance, growing along with it, represented the 'lily-of-the-valley' of Solomon's song." From this would it not be reasonable to infer that this anemone is quite generally recognized as the 'rose of Sharon'?

AMOS W. BUTLER.

Brookville, Ind., Jan. 3, 1887.

Electrical phenomena on a mountain.

In confirmation of the observations of M. F. (*Science*, viii. p. 564) in relation to electrical phenomena on Lone Mountain, near Bozeman, I beg leave to call attention to the fact that more than twelve years ago Mr. Franklin Rhoda, assistant topographer, in his 'Report on the topography of the San Juan country' (*vide* F. V. Hayden's *Report of U.S. geological and geographical survey of the territories for the year 1874*, pp. 456-458, also p. 461), gives a detailed and graphic account of similar electrical manifestations experienced by Mr. A. D. Wilson and

himself at station No. 12, on one of the peaks of the San Juan Mountains, in August, 1874, at an altitude of 13,967 feet above the level of the sea.

An interesting and significant circumstance recorded by Mr. Rhoda was the fact that there was a sudden and instantaneous cessation of the distressing electrical manifestations whenever a stroke of lightning took place, to be speedily renewed by the returning tension of the electricity. He says, "The sharp points of the hundred stones about us each emitted a continuous sound, while the instrument outsang every thing else, and, even at this high elevation, could be heard distinctly at the distance of fifty yards. The points of the angular stones being of different degrees of sharpness, each produced a sound peculiar to itself. The general effect of all was as if a heavy breeze were blowing across the mountain. The air was quite still, so that the wind could have played no part in this strange natural concert, nor was the intervention of a mythological Orpheus necessary to give to these trachytic stones a voice."

JOHN LE CONTE.

Berkeley, Cal., Dec. 25.

Stereoscopic vision.

In reply to the inquiry of Mr. W. H. Pratt in the last issue of *Science*, it is necessary only to consider the various elements which are combined in the formation of a visual judgment. If an observer, who possesses but a single eye, looks out upon a landscape, the relative distance of the different objects viewed may be roughly estimated in terms of some standard arbitrarily chosen, so long as they are not precisely aligned with his eye. The judgment is less accurate as the angular separation of the objects becomes less, and as there are fewer of them at moderate distances for comparison with the rest. Always, and usually unconsciously, he employs one or more of the following elements in judging the distance and form of each object regarded:—

I. Near objects subtend larger visual angles than remote objects of equal size.

II. Near objects are seen more distinctly than those that are remote. The illusion of distance may hence be produced by decreasing the brightness of the object viewed, by changing the nature of the medium, or by increasing the contrast between light and shade.

III. Near objects that are almost aligned with those which are remote, often partly cover them. Covering objects are judged nearer than those covered.

IV. Familiarity with the dimensions of known objects when near enables us to compare them when remote, and thereby judge their relative distance.

V. By moving from one stand-point to another, and comparing the new view with what is retained in memory of the previous one, parallax of motion thus contributes to the formation of a judgment of both distance and form.

All of these elements may be imitated in pictures, except the last. In the examination of ordinary stereographs they are combined with the important element of binocular perspective, and to such an extent that it is impossible to know just how much we are indebted to binocular perspective for the illusion of apparent relief. Skeleton diagrams, properly constructed, are hence the only means of studying stereoscopic

vision, if this term be taken as a synonyme of binocular vision. If Mr. Pratt will try his method with an outline drawing, it will fail.

In regarding an ordinary painting, binocular vision is often a hinderance, rather than an aid, in appreciating perspective. It is at least important to cut off from view the objects surrounding the picture, which we involuntarily take into comparison with it. In the application of geometry to perspective, a single point of view (station-point) is always assumed, and in examining the result the observer should place a single eye as nearly as possible at the same station-point to attain the best perspective illusion. The other eye must be closed, if he wishes to exclude the interfering element of binocular vision which will at once be unconsciously applied to the card or canvas on which the picture has been made.

It is by the observance of these precautions that Mr. Pratt has been able to appreciate perspective in the pictures examined, but true stereoscopic vision was excluded instead of being attained by what he may have supposed to be a new method.

W. LE CONTE STEVENS.

Brooklyn, Jan. 1, 1887.

Star rays.

Mr. Randolph will find the phenomenon of the long vertical rays or streamers proceeding from a strongly luminous point described and fully explained in my little volume entitled 'Sight,' pp. 87-89. They are produced, not by *reflection* from the eyelashes, as he supposes, but by *refraction* of light passing through the meniscus of moisture between the lid and the cornea, and are therefore more distinct when the lids are brought near together. I had investigated the phenomenon and ascertained its cause before I was aware of the very brief mention of it in Daguin's 'Traité de physique,' vol. iv. p. 323.

The radiating points about a star are more difficult to explain. They are probably due to some peculiarity in the structure of the crystalline lens.

JOSEPH LE CONTE.

Berkeley, Cal., Dec. 25.

A German sentence.

In your current number you give an example of a German sentence. In *Teutonicity* it can hardly compete with the following extract from an advertisement of a well-known periodical: "Als eines der vorzüglichsten Weihnachtsgeschenke müssen die elegant gebundenen Quartalsbände der Deutschen Rundschau herausgegeben von Julius Rodenberg Preis pro Band in elegantem, rothem Originallewandband mit Schwarz und Golddruck 8 Mark bezeichnet werden."

N.

Washington, Jan. 3, 1887.

Pleuro-pneumonia.

It may not be worth while to call attention to two slight mistakes in the printing of my communication on p. 631 (viii. No. 204). The 'meplis' should be 'Mehlis,' the author of micrurus; and the 'U. S. fish commission' on the first line of second column should be 'U. S. entomological commission.'

C. V. RILEY.

Washington, D.C., Jan. 3, 1887.

SCIENCE.—SUPPLEMENT.

FRIDAY, JANUARY 7, 1887.

TAXATION OF PERSONAL PROPERTY IN FRANCE, GERMANY, AND THE UNITED STATES.

WHEN Lord Rosebery was in Mr. Gladstone's cabinet as secretary for foreign affairs, he instituted some investigations through his diplomatic and consular officers that resemble closely those carried on by our consuls during the past decade in accordance with the system inaugurated by Secretary Evarts. One of Lord Rosebery's investigations had reference to the system under which personal property is brought into contribution for local or national purposes, and was undertaken by the British ministers at Paris, Berlin, and Washington. The returns have recently been embodied in a parliamentary paper, and present many points of interest. In France there are four heads of direct taxes,—the real-property tax (*contribution foncière*), the door-and-window tax, the personal-property tax (*contribution personnelle et mobilière*), and the tax on professions. The total amounts to be obtained from the first three taxes are first fixed by the budget, and are then divided and subdivided between the departments, *arrondissements*, and communes, until finally the share of each tax-payer is decided on. The *contribution personnelle et mobilière* is of two kinds. The first is a poll-tax of what is considered equivalent to three days of labor, and is payable by every Frenchman in France, and every foreigner of either sex who is not reputed indigent, and who is in possession of his or her 'rights.' The minimum of this tax is 1 franc 50 centimes, and the maximum 4 francs 50 centimes. The second form of personal tax is laid on all those liable to the poll-tax, and is proportioned to the letting price of the house or apartment each may inhabit. The assessors are the mayor of the commune and his adjoint or adjoints, and five citizens, termed *répartiteurs*, named by the head of the *arrondissement*, and changed annually. An elaborate system of councils provides for the assessment, collection, and payment of these taxes. Besides these main state taxes, there are so many *centimes additionnels*. These are of three kinds,—*généraux*, when for the exigencies of the state; *départementaux*, when for the departmental administration; *communaux*, when for the communal administration. A special category of *cen-*

times additionnels is also provided, the returns from which are granted to the ministry of agriculture or finance for special emergencies, such as the abatement or return of taxation to persons or districts which have suffered from floods, fire, hail, etc.

The tax on professions or trades (*patentes*) is also a personal tax, but its amount cannot, like the other three, be fixed beforehand. There is an official scale according to which each industry or profession is taxed; and the administrator of direct taxes determines the schedule into which each tax-payer shall be placed, and settles the *droit fixe* and the *droit proportionnel*. The *droit fixe* is based on the population and the nature of the trade or profession. The *droit proportionnel* is fixed according to the annual rental of the buildings or premises used for the exercise of the trade, industry, or profession. This *contribution des patentes* is due by every Frenchman or foreigner who exercises a trade, industry, or profession not included in the exceptions made by law. Mr. Edgerton, who has prepared the paper on personal taxation in France, remarks that the general tendency of late changes in the scale of this tax has been to abate the amounts paid by the smaller industries, and to increase those paid by the larger ones. For example: in 1880 the fixed *patentes* on bankers was increased from 1,000 to 2,000 francs.

The return for Germany in answer to Lord Rosebery's circular applies to Prussia only, as no direct taxes are levied for the account of the imperial government. But Prussia serves as a type of all the other German states, since their system and method of assessment are modelled on hers.

In Prussia all communes not having sufficient independent revenue to cover their local requirements may raise such necessary revenues, either by surtaxes (*zuschläge*) based on the rates of certain specified state direct taxes, or by special sanction from the state to impose special taxes, direct or indirect. The former alternative is the one usually chosen by such communes as have not an independent revenue from real property. The wealthiest communes dispense with these surtaxes altogether, while in the poorer communes the surtax is as high as 300 or 400 per cent of the state tax. The state taxes, which serve as the basis of computation for these surtaxes, are:—
(a) Personal: I. Class tax on personal net annual incomes under 3,000 marks; II. Classified income

tax on annual net incomes above 3,000 marks; III. Trading tax. (b) On real property: IV. Ground tax; V. House tax.

Under I. were put, in twelve classes, the incomes above 420 and under 3,000 marks; and the annual tax is from 3 to 72 marks, incomes under 420 marks being exempt.

By a law passed in 1883, all incomes under 900 marks were exempted, and the remaining classes relieved from one-fourth of their tax; the instalments due in July, August, and September of each year being remitted.

Under II. are put the incomes over 3,000 marks; and they fall into forty classes, the tax ranging from 90 to 21,600 marks, the latter on an income from 720,000 to 780,000 marks. The pay of persons in the standing army is exempt from state taxation, and has only this year been made liable to local taxation. In assessing the communal surtaxes, only half the salary of government officials is taken into account. An annual net income is construed to be the net income derived from all descriptions of property and occupations after deducting interest paid on proved debts, amounts paid in other taxes, and costs of production. Deductions are also allowed in special cases where the tax-payer has a large family to support. The assessment of this class tax is intrusted to a board composed of the president of the commune and of members elected by the communal representative body, all classes of tax-payers being represented as far as possible. Each tax-payer is duly notified of the class in which he is placed, and opportunity is offered him for protest or application for deduction.

The system of assessing III., the trade tax, is quite complicated. Persons liable to this tax are distributed into classes, ranging from large trades down to hackmen. The individual assessment is thus determined: each class, except the highest, is subdivided into four sections, and a medium rate is fixed for each section in each class. This medium rate, multiplied by the number of persons liable for taxation in the first three sections of each class in the case of towns, and in the fourth section in the case of a *Kreis* or circumscription, represents the total annual amount of the tax for which the town or *Kreis* is liable, and which it has to collect for the state. If the medium rate falls too heavily on any members of a class, they are assessed less, and the rate is raised for those members of the same class who are better able to pay. Steamers pay an annual tax of 0.75 of a mark for every horse-power; and carriers by land, with two horses and upwards, pay an annual tax of 3 marks for each horse.

The report on the United States is prepared by

Mr. Helyar, second secretary of legation at Washington, and is based on the works of Burroughs and Cooley, and on some details gathered by Mr. E. J. Reinck of the U. S. treasury.

A HAIRY HUMAN FAMILY.

THE superabundance of hair in certain members of the human family is one of the important problems of anthropology. Dr. Ecker named this phenomenon 'hypertrichosis' ('On the pilous system and its anomalies,' analyzed in *Revue d'anthropologie*, 1880, p. 170). In Ecker's third class, or 'dog-men,' are included those subjects in which the hypertrichosis is general. In 1879 two Russians, father and son, were exhibited in Paris, who were good examples of this anomaly. The case of Barbara Ursler, reported in 1639-56, is reviewed by Dr. Ecker, with an illustration, in *Archiv für anthropologie*, xi. 1879, p. 176 (see also *Globus*, xxxiii. 1878, Nos. 12 and 14; and Stricker, 'Ueber die sogenannten Haavmenschen, Frankfurt-a.-M.,' 1877, p. 97; Bernhard Ornstein, in *Archiv für anthropologie*, xvi. pp. 505-510; Dr. O. Fraas, *Archiv*, xiv. 1883, pp. 339-342; Mme. Clemence Royer, 'Sur le système pileux,' *Revue d'anthropologie*, 1880, pp. 13-26).

Adrien Teftichew, of the government of Koscroma, Russia, mentioned above, was, at the time of his exhibition in Paris, fifty-five years old. It was from his appearance that this type received the name of 'dog-men.' His forehead, cheeks, eyelids, ears, and nose were covered with long, smooth hair. The neck, body, and extremities were covered with hair, but not so long as that upon the face. The son Theodore did not differ materially in this respect from his father.

The Birman family, as described by Ecker, consisted of Schwé-Maong, thirty years old, his daughter Maphoon and her two sons,—three generations presenting this anomaly. Moreover, the lower jaw of Schwé-Maong had only four incisors and the left canine; the upper jaw, only four teeth; the molars are entirely wanting, their place being filled by fleshy gutters on the gums. Even the alveolar processes are supposed to be absent.

Schwé-Maong affirms that he never lost any teeth, and that the eruption of his permanent teeth did not take place until he was twenty years old. Maphoon also lacks canines and molars, whose places are supplied by the fleshy gutters with which she does her masticating.

Dr. Ecker further describes the famous Mexican danseuse, Julie Pastrana, and a child named Possassi, of Hufeland, described by Dr. Beverne in 1802.

It is well known that at seven months the human foetus is entirely covered with hair. These hairs traverse the skin obliquely, and continue to increase slowly until they attain from a quarter to half an inch in length, when they are replaced by the small persistent hairs. The infant comes into the world covered with embryonal hair. The dog-men are covered with a woolly or silky hair, presenting embryonal characters. Both Ecker and his reviewer, Dr. Vars, agree that general hypertrichosis is simply an arrest of development; that is to say, the down, instead of being replaced by hair, persists and continues to develop.

I had not heard of the transfer of the Birman family to England until I read the newspaper report recently. There is no reason to discredit the account, proper allowance being made for enthusiastic hyperbole.

O. T. MASON.

CONTAGIOUS DISEASES.

In a paper recently read before the Philadelphia county medical society, Dr. Arthur V. Meigs takes the ground that scarlet-fever is very much less contagious than is commonly supposed; much less, in fact, than measles and whooping-cough; and in proof of his opinion, he cites the fact, that, while it is the rule for measles and whooping-cough to affect all the children in a household, scarlet-fever usually limits its attack to one or two, even though there may be others who have never had the disease, and are therefore presumably susceptible. There is one point which the author of the paper does not, it seems to us, lay sufficient stress upon; and that is, that, while parents dread scarlet-fever, they have but little fear of measles or whooping-cough, and, being influenced by that popular impression that all children must at some time of their lives have these latter diseases, they take no pains to isolate the sick from the well, as they do if the disease be scarlet-fever. The writer could give repeated instances where the most rigid isolation was practised in cases of measles, in which but one member of a family was attacked, though there were a number of others who were presumably susceptible. Until, therefore, the same scrupulous care is taken to separate the affected child from the unaffected in measles as is done in scarlet-fever, we shall hesitate to accept the conclusion that scarlet-fever is much less contagious than measles. This will probably never be done until parents are taught that measles is not a trivial disease, but is, in fact, many times a most serious one. In England the number of deaths in five years from measles was 42,139; in Brooklyn in ten years 1,012 children

died from this cause; and in New York during the week ending Dec. 4, 42 deaths from it are recorded. This takes no account of the countless number that are left with impaired constitutions and lung diseases, and who, within a very short time after this attack of measles, appear in the mortality statistics as victims to bronchitis or pneumonia. And the same may be said of whooping-cough,—a disease which, in the period 1875–79, caused in England alone 66,730 deaths.

SYNECHDOCHICAL MAGIC.

ALL students of anthropology are familiar with the belief among lower peoples that what is done to a part of a person or to his property is done to him. These people all dread to have the smallest part of their bodies or their intimate possessions go from them. It has always seemed to me to need further explanation, a more simple and commonplace solution.

This is given in Mr. A. W. Howitt's paper in the August number of the *Journal of the Anthropological Institute*. I quote his language:—

“Connected with the throwing of magical substances in an invisible form is the belief that they can be caused to enter the body of a victim by burying them in his footsteps, or even in the mark made in the ground by his reclining body. Sharp fragments of quartz, glass, bone, charcoal, are thus used, and rheumatic affections are frequently attributed to them.

“Another form of this belief is seen in the practice of putting the jagged cone of the *Casuarina quadrivalvis* into a man's fire, so that the smoke may blow into his eyes and cause him to become blind. The idea seems to be that the *eidolon* of the cone will produce acute ophthalmia.

“A piece of hair, some of his faeces, a bone picked by him and dropped, a shred of his opossum rug, will suffice. Even his saliva may be picked up and used for his destruction.”

The explanation of all this, which I have long sought, is given in the very words of one of Mr. Howitt's informers, who said, “You see, when a blackfellow doctor gets hold of something belonging to a man and roasts it with things, and sings over it, *the fire catches hold of the smell of the man* [italics mine], and that settles the poor fellow.” In other words, the smallest part of a man, or of any thing he has touched, will suffice to give the demon his scent.

Of course, customs survive millenniums after the cause of their origin is forgotten, and it is scarcely probable that those who carefully burn their waste hair and nails do so to avoid giving

the witches their scent or the means of indentifying them. The savage who refuses to allow his picture to be taken, and the felon who objects to having his 'mug' adorn the walls of Rogues's gallery, are not so far apart, if we can bring our minds to identify the devil of the former with the detective of the latter. O. T. MASON.

PROFESSOR NEWBERRY ON EARTH-QUAKES.

PROFESSOR NEWBERRY'S paper on earthquakes is, in the words of the author, "a brief review of what is known and believed in regard to the phenomena and causes of earthquakes by those whose opinions on this subject are most worthy of confidence." After defining the word 'earthquake,' he proceeds to give a summary of the facts upon which he bases his definition, carefully elaborating and illustrating the subject from the point of view of a cooling and contracting sphere, with a relatively thin crust, and fluid or viscous interior. The latter part of the essay is treated under the headings, 'Earthquakes and volcanoes as measures of the thickness of the earth's crust,' and 'Flexibility of the earth's crust.' Finally, 'Proximate causes of earthquakes' are briefly considered, and a short bibliography is appended.

The definition, which is taken as the text, and which is really an epitome of the whole argument, is as follows: "An earthquake is a movement caused by a shrinking from the loss of heat of the heated interior of the earth, and the crushing-together and displacement of the rigid exterior as it accommodates itself to the contracting nucleus." It is then stated that the facts upon which this statement is based are so numerous and significant that the conclusion 'is not only convincing, but inevitable.' Although this broad generalization is perhaps applicable in the case of most earthquakes, and the theory as to the structure of the earth which it involves is very generally accepted by geologists, yet, in view of the fact that many eminent scientific men are not prepared to subscribe to it at all, in either case it is to be regretted that the author has not adopted the comprehensive and more non-committal definition given by Mallet, and substantially repeated as follows by Powell (in *The forum* for December): "An earthquake is the passage of waves of elastic compression in the crust of the earth." The very fact that different theories are to be found, even in the very latest utterances of eminent authorities, would seem to make it desirable to acknowledge that the subject is not one that

Earthquakes. By Prof. J. S. NEWBERRY. New York, *The author*, 1886. 8°.

can be disposed of in such an *ex cathedra* statement, but rather one worthy of the most painstaking study, which, indeed, it is now receiving from the most advanced nations. The further statement that "earthquakes are neither novel nor mysterious, but are among the most common and simplest of terrestrial phenomena," is not likely to receive very wide acceptance in its entirety, and issue will certainly be taken with Professor Newberry as to there being any very great degree of unanimity in this opinion among "those whose opinions are most worthy of confidence." Similarly it must be said that far more confidence is placed by the author in the various methods of calculating the depth of origin by means of accurate observations as to time and angle of emergence than seems warranted. The problem is so complicated by the great heterogeneity of the superficial formation of the earth's crust, that the best observations we can make, give, at best, only roughly approximate results. Again, it is stated that the reported shortening of railroad-tracks in certain places near Charleston, "if verified and measured, would give a clew to the location and extent of the subterranean movements which produced the vibrations." Most authorities, however, will probably regard it, in the case of a shock disturbing so great an area, as an entirely secondary effect, along with the production of local sinks, geysers, and land-slides.

This well arranged and condensed *résumé* of the subject, from the stand-point of a geologist of Professor Newberry's reputation, cannot fail to be read with interest by the general reader as well as by the special student. The only criticism that can be made, other than favorable, seems to be that to the average reader it may leave the impression that the causes of all earthquakes, and even the nature of the earth's interior, are now so well understood as to leave very little room for difference of opinion among those best qualified to judge. EVERETT HAYDEN.

PHANTASMS OF THE LIVING.

THIS is a most extraordinary work, — fourteen hundred large and closely printed pages by men of the rarest intellectual qualifications, for the purpose of setting on its legs again a belief which the common consent of the 'enlightened' has long ago relegated to the rubbish-heap of old wives' tales. In any reputable department of science the qualities displayed in these volumes would be reckoned superlatively good. Untiring zeal in collecting facts, and patience in seeking to

Phantasms of the living. By EDMUND GURNEY, FREDERIC W. H. MYERS, and FRANK PODMORE. 2 vols. London, *Trübner*, 1886. 8°.

make them accurate; learning, of the solidest sort, in discussing them; in theorizing, subtlety and originality, and, above all, fairness, for the work absolutely reeks with candor, — this combination of characters is assuredly not found in *every* bit of so-called scientific research that is published in our day.

The book hardly admits of detailed criticism, so much depends on the minutiae of the special cases reported: so I will give a broad sketch of its contents. The title, 'Phantasms of the living,' expresses a theory on which the recorded facts are strong, but of which the latter are of course independent. The 'facts' are instances of what are commonly called 'apparitions.' Collected for the Society of psychical research, their sifting and cataloguing is a laborious piece of work which has a substantive value, whatever their definitive explanation may prove to be. Very roughly speaking, there are reported in the book about seven hundred cases of sensorial phantasms which seem vaguely or closely connected with some distant contemporaneous event. The event, in about one-half of the cases, was some one's death. In addition to these cases, Mr. Gurney has collected about six hundred of hallucinations seemingly irrelevant to any actual event, and thus has certainly a wider material to work upon than any one who has yet studied the subject of phantasms. Of course, the rationalistic way of interpreting the coincidence of so large a number with a death or other event, is to call it chance. Such a large number of 'veridical' phantasms occurring by chance would, however, imply an enormous total number of miscellaneous phantasms occurring all the while in the community. Mr. Gurney finds (to take the visual cases alone) that among 5,705 persons, interrogated at random, only 23 visual hallucinations had occurred in the last twelve years. And combining by the calculus of probabilities such data as the population drawn upon for the coincidence-cases, the adult population of the country, the number of deaths in the country within twelve years, etc., he comes to the conclusion that the odds against the chance occurrence of as many first-hand and well-attested veridical visual phantasms as his collection embraces, is as a trillion of trillions of trillions to 1. Of course, the data are extremely rough; and, in particular, the census of phantasms occurring at large in the community ought to be much wider than it is. But the veridical phantasms have, furthermore, many peculiarities. They are more apt to be visual than auditory. Casual hallucinations are oftener auditory. The person appearing is almost always recognized; not so in casual hallucinations. They tend to coincide with a particular

form of outward event, viz., death. These and other features seem to make of them a natural group of phenomena.

The next best rationalistic explanation of them is that they are fictions, wilful or innocent; and that Messrs. Gurney, Myers, and Podmore are victims, partly of the tendency to hoax, but mainly of the false memories and mythopoietic instincts of mankind. These possibilities do not escape our authors, but receive ample consideration at their hands. Nothing, in fact, is more striking than the zeal with which they cross-examine the witnesses; nothing more admirable than the labor they spend in testing the accuracy of the stories, so far as can be done by ransacking old newspapers for obituaries and the like. If a story contains a fire burning in a grate — *presto* the Greenwich records are searched to see whether the thermometer warranted a fire on that day; if it contains a medical practitioner, the medical register is consulted to make sure *he* is correct; etc. But obviously a hoax might keep all such accessories true, and a story true as to the main point might have grown false as to dates and accessories. It therefore comes back essentially to the investigator's instinct, or *nose*, as one might call it, for good and bad evidence. A born dupe will go astray, with every precaution; a born judge will keep the path, with few. *Saturday reviewers* will dispose of the work in the simplest possible way by treating the authors as born dupes. 'Scientists' who prefer offhand methods will do the same. Other readers will be baffled, many convinced. The present writer finds that some of the cases accounted strong by the authors strike him in the reading as weak, while scruples shown by them in other cases seem to him fanciful. This is the pivot of the whole matter; for I suppose the improbability of the phantasms being veridical by chance, will, if the *stories* are true, be felt by every one. Meanwhile it must be remembered, that, so far as expertness in judging of truth comes from training, no reader can possibly be as expert as the authors. The way to become expert in a matter is to get lots of experience of that particular matter. Neither a specialist in nervous diseases, nor a criminal lawyer, will be expert in dealing with these stories until he has had Messrs. Gurney's, Myers's, and Podmore's special education. Then his pathology, or his familiarity with false evidence, may also serve him in good stead. But in him, or in them, 'gumption' will, after all, be the basis of superiority. How much of it the authors have, the future alone can decide.

One argument against the value of the evidence they rely on is drawn from the history of witchcraft. Nowhere, it is said (as by Mr. Lecky in his

'Rationalism'), is better-attested evidence for facts; yet the evidence is now utterly discredited, and the facts, then apparently so plenty, occur no more. Mr. Gurney considers this objection, and comes to an extremely interesting result. After "careful search through about 260 books on the subject (including the principal ones of the sixteenth, seventeenth, and eighteenth centuries) and a large number of contemporary records of trials," he affirms that the only facts of witchcraft for which there is any good evidence whatever are those neuropathic phenomena (trance, anaesthesia, hysteria, 'suggestion,' etc.) which, so far from being now discredited, are more than ever ascertained; while the marvels like conveyance through the air, transformation into animals, etc., do not rest on a *single* first-hand statement made by a person not 'possessed' or under torture.

The authors' theory of veridical phantasms is that they are caused by thought-transference. The ghost theory and the 'astral-form' theory are criticised as unsatisfactory (ghosts of clothes, phantasms not seen by all present, etc.). Thought-transference has been once for all established as a *vera causa*. Why not assume that even the impressions announcing death were made during the last moments of the dying person's life?

Where the apparition is to several witnesses, this explanation has to be much strained; and, in spite of Messrs. Myers's and Gurney's ingenuity, I can hardly feel as if they had made out a very plausible case. But any theory helps the analysis of facts; and I do not understand that Messrs. Gurney and Myers hold their telepathic explanation to have at present much more than this provisional sort of importance.

I have given my impression of the ability of the work. My impression of its success is this: the authors have placed a matter which, previous to them, had been handled so loosely as not to compel the attention of scientific minds, in a position which makes inattention impossible. They have established a presumption, to say the least, which it will need further statistical research either to undo or to confirm. They have at the same time made further statistical research easy; for their volumes will certainly stimulate the immediate registration and publication, on a large scale, of cases of hallucinations (both veridical and casual) which but for them would have been kept private. The next twenty-five years will then probably decide the question. Either a flood of confirmatory phenomena, caught in the act, will pour in, in consequence of their work; or it will *not* pour in — and then we shall legitimately enough explain the stories here preserved as mixtures of odd coincidence with fiction. In the one case Messrs.

Gurney and Myers will have made an epoch in science, and will take rank among the immortals as the first effective prophets of a doctrine whose ineffectual prophets have been many. In the other case they will have made as great a wreck and misuse of noble faculties as the sun is often called to look down upon. The prudent bystander will be in no haste to prophesy; or, if he prophesy, he will hedge. I may be lacking in prudence; but I feel that I ought to describe the total effect left at present by the book on my mind. It is a strong suspicion that its authors will prove to be on the winning side. It will surprise me after this if neither 'telepathy' nor 'veridical hallucinations' are among the beliefs which the future tends to confirm.

WILLIAM JAMES.

MURRAY'S HANDBOOK OF PSYCHOLOGY.

DR. MURRAY has written an excellent elementary text-book for students of psychology. In the present state of that science, it is difficult to present its doctrines in a form suitable for didactic purposes. It is often necessary for the author to leave untouched certain important questions, the settlement of which is only possible by a controversial excursion into the department of metaphysics.

Dr. Murray's book is not a treatise on physiological psychology, although the conclusions of physiologists seem to be familiar to him. He has occupied himself chiefly with what is called 'subjective psychology,'—a field which must be traversed before one can enter upon the more positive science of the relation of psychical to nervous states. He treats of psychology and its method, gives a full and satisfactory account of sensation, analyzing the knowledge given by the various senses, and noticing the subject of general or organic sensations. This is followed by an account of association and its laws, and a short chapter on comparison. These subjects constitute what he describes as 'general psychology.'

'Special psychology' has to do with 'cognitions, feelings, and volitions,'—a threefold division, corresponding to the classical partition of 'intellect, feeling, and will.' Under the head of 'cognitions' we find an account of perceptions, generalization, reasoning, idealization, illusory cognitions, and a chapter on the general nature of knowledge, which discusses 'self-consciousness, time, space, substance, and cause' from the psychological rather than the metaphysical point of view. After an introduction treating of the nature of pleasure and pain and the expression

A handbook of psychology. By J. CLARK MURRAY. London, Gardner, 1885.

and classification of the feelings, are chapters on the feelings of sense, feelings originating in association, feelings for self and for others, feelings originating in comparison, intellectual feelings, and feelings of action. Four chapters are devoted to volition, the last treating briefly of the freedom of the will.

As we said above, the book is an excellent one, and few serious sins of commission can be charged against it. We question somewhat the advisability of the abrupt divorce of perception and sensation as kinds of mental conditions. Mr. Sully, in his 'Outlines of psychology,' agrees with the author in his separation of these states or actions. It seems to us that a sensation is nothing more than a nervous stimulus unless it is perceived. Perception is the perception of a sensation, and nothing more. When we pass beyond the perception of sensations to a knowledge, say, of objects, we may explain that knowledge either by the association of the perceptions, or by the union of the perceptions in the act of conception. For this reason we believe that those who, with Sir William Hamilton, use the term 'sense-perception,' use an awkward term, but one which is scientifically accurate.

The author's treatment of the process of representation is one of the most unsatisfactory parts of the book. His account of association is not sufficient to give information about all that we call popularly 'memory.' We also fail to find any chapters on reflex action or on the highly important subject of unconscious mental modifications. On the other hand, Dr. Murray's simple and interesting account of illusory cognitions deserves high commendation, and his classification of the feelings seems to us to be both natural and scientific.

The author (p. 23, *et seq.*) appears to view with but little favor the results of investigation in the department of psychophysics. We have no space to discuss the question how far his caution or scepticism is justified. On both sides of the Atlantic this branch of psychology is enjoying a very extraordinary share of attention, and suggestive and interesting results have been reached. We are inclined to regard these investigations as of less importance than those engaged in them are disposed to attach to them, and we confess that we await with some expectancy results commensurate with the amount of labor expended in gathering the statistics which form so prominent a part of the periodical literature on philosophy.

Dr. Murray's closing chapter on the freedom of volition, we regard as perhaps the least scientific part of his book. His doctrine is suggested in the sentence, "The very nature of volition, therefore,

would be contradicted by a description of it in terms which brought it under the category of causality" (p. 417).

The book, however, is admirably adapted for teaching the elements of psychology to classes in schools and colleges.

TWO VALUABLE PRIMERS OF POLITICS.

It has been said that greater ability is needed to develop and elucidate fundamental principles than to deduce from them an elaborate set of conclusions. This is doubtless true; and for that reason most primers, whether of literature, history, science, or politics, are failures, in that they are the work of well-meaning but insufficiently and narrowly informed students. That leading specialists can use their talents to good purpose in writing primers, and thus bring their influence directly to bear on the generation in process of education, has been amply demonstrated by Professors Huxley, Roscoe, Balfour Stewart, Geikie, Michael Foster, Jevons, and others. The two little books to which we have reference in the heading of this notice rank, with the works of the authors just mentioned, as primers that are worth something. They have something in common, in that they are written primarily for English readers by an English woman and an English man respectively. There the resemblance ceases. Miss Buckland's primer¹ is a summary of existing English institutions, and we are free to say that we have never seen them more clearly, more concisely, and more accurately pictured. Miss Buckland draws to a large extent from the books in the 'English citizen' series on particular institutions and phases of English politics, but the completeness and articulation of this little book are peculiarly her own. She treats of the constitution in general, of the sovereign, parliament, the house of lords, the house of commons, the privy council, the national budget, the English church, education in England, local government, and so on. The careful reader will obtain from the book a very thorough knowledge of the workings of English governmental institutions; and it is just such a book as a teacher should use for a few weeks with a class that has completed the study of English history, in order to enable the pupils to follow and discuss intelligently current English politics. We do not recall an inexact or wrong statement in the book, considered simply as an exposition. On p. 34 is an obvious misprint, £71,000 being given as the amount of the annual allowance to the Queen's family. The correct sum is £171,000, and it is so stated by Miss Buckland on p. 9.

¹ *Our national institutions: a short sketch for schools.* By ANNA BUCKLAND. London, Macmillan, 1886. 16°.

As Miss Buckland's primer is one of political exposition, so Mr. Raleigh's¹ is one of philosophical exposition, and it rises to a very high plane indeed. For obvious reasons the author's illustrations are drawn principally from English history and English institutions; but as society and civilization are not national, but international, Mr. Raleigh's able volume should attract much attention and find numerous readers in this country. In his preface the author states that most controversies would end before they begin if the disputants would only define the terms that they use. The pages that follow are an attempt to define and make explicit the terms used in political argument. As the author himself allows, his book will stimulate rather than satisfy inquiry; and for just that reason it is capable of becoming, in the hands of a competent teacher of civics or politics, an invaluable text-book. It is eminently impartial, and for that reason might in some parts mystify rather than satisfy the beginner; but, properly interpreted, it can be made of the greatest service. The author begins by summarizing (the whole book only contains 163 small pages) the principles which lie at the basis of society and civilization; then he examines modern society and the modern state, and passes to elections, party government, economic terms and principles, the functions of the state, and propositions looking to reform. Lack of space forbids our quoting as much as we should wish from Mr. Raleigh's compact volume, but to a few salient points we must call particular attention. He enforces, from many points of view, the position that no abstract theory of government, nor any radical law, can give the prosperity and satisfaction demanded by certain theorists who call for revolution and reform. "The cardinal error of revolutionary politicians is this, that they assume the possibility of breaking away from custom and tradition. They look on institutions as if they were purely artificial, and therefore alterable at pleasure. In point of fact, institutions are rooted in the natures of men who are accustomed to them. If all our laws were destroyed in a day, our habits and ways of thinking would remain, and out of these a new set of laws, not very unlike the old, would soon be developed. If we desire great changes, we must not put our trust in revolution: we must work steadily at those reforms which seem most likely to improve our habits and ways of thinking" (p. 127). And in connection with this subject, reform, there is this timely warning given: "When social reformers put forward schemes by which the strain of competition would be lessened, we must exam-

ine their proposals carefully, to find out whether they do not involve an appeal to the selfishness of the weak, which is just as dangerous in its way as the selfishness of the strong" (p. 97). Mr. Raleigh's remarks about speculation (p. 99), the effect of state help (p. 130), and his summary of how far state interference can safely go (pp. 150 and 157), are as scientific in form as they are satisfactory in contents. We most unreservedly commend the book as a clear, strong, and healthy primer of politics, and heartily wish that it could be studied and appreciated in every high school and by every citizen of the United States.

A SANITARY convention under the auspices of the Michigan state board of health was held at Big Rapids, Nov. 18 and 19, 1886. Dr. Stoddard read a paper on the injuries of every-day drug-taking. It partly came from mothers dosing babies with soothing-syrup, paregoric, worm-lozenges, etc. The remedy was to educate the people in the injurious effects of drugs. Dr. Inglis of Detroit closed his remarks on alcohol as a medicine by saying that he should like to produce the continually accumulating evidence of the positive harm caused by such indiscriminate use of all kinds of alcoholic drinks, bitters, and tonics, and that physicians should let alcoholic liquor be the last, and not the first, remedy in the treatment of disease. Professor Ferris of the Industrial school read a paper on hygiene of schools, dwelling upon the lack of ventilation in the schools of Big Rapids, in several the air-space for each pupil not exceeding two hundred cubic feet. Papers were read on Pasteur and preventive medicine, public-health laws, and the prevention of communicable diseases.

— Intubation of the larynx, which has been introduced recently as a substitute for tracheotomy in cases of diphtheria and croup, is coming into general favor with medical practitioners. The credit of its introduction is due to Dr. O'Dwyer, a New York physician. Already one hundred and sixty-five cases have been reported in which it has been practised, with twenty-eight and one-half per cent of recoveries. The introduction of the tube into the larynx is a very simple operation, and requires no anaesthetic nor trained assistants. Inasmuch as no cutting operation is required, as in tracheotomy, there is no difficulty in persuading parents to consent to the intubation of their children, when the more formidable operation of tracheotomy would not be permitted. This percentage of recoveries will doubtless be much increased as physicians become more accustomed to the method.

¹ *Elementary politics*. By THOMAS RALEIGH. London, Oxford univ. pr., 1886. 16°.